

### Analysis of Machines for Cutting and Leveling Lawns, Types and their Effectiveness

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#### ABSTRACT

*This article provides information on the construction parameters of the mowing machines, their advantages and disadvantages, which are used to shape lawns and lawns on a large scale in the territory of our republic. Information is also provided on the newly proposed new type of energy efficient 12 volt DC lawnmower design.*

Green nature raises the mood of a person and gives him peace. Creating green nature and keeping it always in the same form is one of the most complex and labor-intensive processes. Among these processes, choosing a special type of grass and quality seeds, ensuring its uniform germination, as well as timely watering, organizing care and ensuring that they are evenly distributed require a lot of time and labor. The following processes describe in detail the different types of mowers commonly used to maintain a uniform length of grass after emergence, as well as the construction, advantages, and disadvantages of these types of machines.

It is not a secret to anyone that nowadays in our republic under the slogan "green field" as well as in the world, a lot of attention is being paid to greening and beautification. It's natural to get excited when you see a green field. In order to make a lot of areas greener, seeds of various decorative grasses are sown on the land in large quantities, and after they germinate, they are cut with the help of special machines in order to keep them in the same shape and height so that they do not overgrow the heights. Such processes are carried out several times a year in each area. Most of these machines were produced in the People's Republic of China, and their various

modifications are widely used in Uzbekistan. Some types are also produced in Uzbekistan.

Before using any device, it depends on the thinking and analytical ability of each person to be interested in its technical characteristics. The most interesting thing for any person nowadays is that the equipment or device is economically efficient, i.e. high productivity, low consumption of labor and material costs, ease of use and universality of working bodies.

The EVT-1200 mobile lawn mower of the ERA company of the People's Republic of China carries out working processes while hanging on the shoulder. Its power is equal to 1200 W, and a two-stroke gasoline engine is installed on it. The rotation speed of the cutting device is equal to 8500 rpm. The productivity of EVT-1200 can mow about 70...80 m<sup>2</sup> of grass in one hour. The coverage width of this machine is from 255 mm to 400 mm (Fig. 1). Its working body fixed to the bar is mainly made of strong flexible material. The advantage of this is that it has the same ability to mow the grass under the narrow, concrete or steel post. As for the disadvantages, it does not ensure the same mowing height, the device is difficult to control while hanging on the shoulder, and the labor and energy consumption is also high, this device cannot cut dry grass. Because a flexible working body does not allow this. Below is the view of the EVT-1200 type knife machine (Fig. 1).



**Figure 1. A view of the EVT-1200 lawn mower**

1- cutting knife; 2- barbell; 3- control handle.

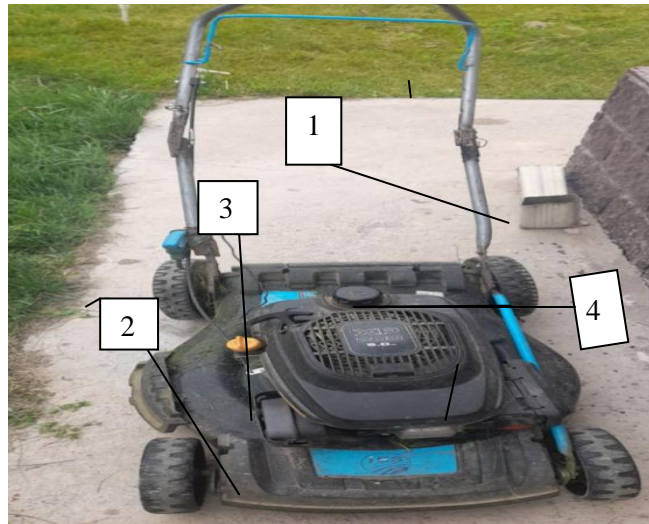
One of the machines performing such a task is the HUTEK electric type, the model of this machine is TLM-1400, it is designed to work at 220 volt alternating current, the cutting coverage width is 380 mm, and the cutting height is 15...65 mm, the size of the hopper for collecting the cut mass It is 40 liters. Among such machines is Mower IM-16001, designed to work at 50 Hz 230..240 volts, engine power 1400 W, height of mowing lawns 20-65 mm, size of hopper for collection of mowed mass is 40 liters.

All three lawn mowers are manufactured in the People's Republic of China. The energy source of the EVT-1200 lawn mower shown in Figure 1 is a 2-stroke gasoline internal combustion engine. This ensures that the machine can be operated while being carried over the shoulder. The working body of this machine is made of durable polyvinyl chloride with a flexible diameter of 3 mm. Advantages are designed for mowing lawns around concrete walkways under trees.

TLM-1400 and Mower IM-16001 lawn mowers are similar in structure, operation and operation. Both machines are designed to work with electric power, and they differ mainly in the power of

the engine and the size of the hoppers for collecting grass clippings. The operation of both devices is carried out by a progressive movement of the person while standing. The disadvantage of these machines is that they cannot mow lawns under trees or near concrete pavements. The second main disadvantage is that the devices can be used only where there is 220 volt AC electricity, and the third is the small size of the hoppers.

The next lawn mower is IESUZ PLM-5HP, its appearance is depicted in Figure 2.



**Figure 2. The front view of the IESUZ PLM-5HP type rotor lawn mower is depicted.**

1st control handle; 2-drive wheels; 3rd blade chamber; 4-gas tank.

The weight of this machine is 30.5 kg, it is equipped with a 2-stroke single-cylinder gasoline internal combustion engine, the power consumption of which is  $R=3.5$  kW. The width of the blade is 53 cm, and one blade is installed. The speed of rotation of the engine was  $n=2800$  rev/min. As can be seen from the above information, firstly, a very large engine was installed for a small power that required very little power, and secondly, the weight of the car increased excessively, i.e. 30.5 kg. Due to the heavy weight, it is necessary to spend a lot of effort to manage it, and there is no hopper for collecting the cut mass.

Where all the above mentioned lawnmowers should use little power, it can be seen that the rear uses a considerable amount of power. It was necessary to conduct some experiments in order to determine the power required to mow these lawns. For this purpose, it is planned to carry out elementary experiments in order to determine the structure of the working body and the power of the engine in an approximately static state, by placing a 3 mm cylindrical ball on top of several leaves of grass with a length of 20 cm. It is also possible to determine the strength of resistance by cutting a certain part of the mass with a sharp blade. Also, since the working body is of two types, i.e., one is a flexible hard material, and the other is made of (+) plus-shaped sharpened sharp blade. Since the blade of the knife is sharp, it does not require much force. A special type of detail was prepared by the turning method for fastening the working bodies (Fig. 3).



**Figure 4. Top view of a 12 volt DC motor.**

1-engine housing; 2nd engine drive shaft; 3. Connection wires to the power source.

In landscaping, different weeds and specially planted grasses at a certain height to ensure that they are always the same will give a unique look to the landscape design.

In conclusion, it can be said that the efficient use of internal reserves as much as possible and the creation of new types of constructive machines and devices with high economic indicators have become one of the urgent issues of today. Also, in places where there is no alternating electricity, this device can be used using a 12-volt battery with a capacity of 35...45 Ampere hours.

**References**

1. Technical characteristics of the lawn mower EVT-1200
2. Technical characteristics of TLM-1400 and Mower IM-16001 machines.
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